EXHIBIT 74

IN THE UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

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CARNEGIE INSTITUTION OF
WASHINGTON AND M7D CORPORATION,

Plaintiffs,

vs. CASE NO: 20-CV-189 (JSR)

PURE GROWN DIAMONDS, INC., and
IIA TECHNOLOGIES PTE. LTD. d/b/a
IIA TECHNOLOGIES,

Defendants.

****

CARNEGIE INSTITUTION OF
WASHINGTON and M7D CORPORATION,

Plaintiffs,

vs. CASE NO: 20-CV-200 (JSR)

FENIX DIAMONDS, LLC,

Defendants.

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The video deposition of YOGESH K. VOHRA, Ph.D., taken remotely via Zoom videoconference with the witness located in Washington, DC, on July 31, 2020, commencing at approximately 10:00 a.m. ET

Reported by:

L. ALAN PEACOCK, RDR, CRC, CCR

JOB NO. 48951

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EXAMINATION

DEPOSITION OF YOGESH K. VOHRA, PH.D., 7-31-2020

DEPOSITION EXHIBITS

EXHIBITS (Continued)

EXHIBITS (Continued)

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THE VIDEOGRAPHER: Here begins Volume I, Disk 1, in the video deposition of Yogesh Vohra taken in the matter of, Case 1, Carnegie Institution, et al., versus Pure Grown Diamonds, et al. We also have Case 2, which is Carnegie Institution, et al., vs Fenix Diamonds, et al., in the United States District Court, Southern District of New York. 09:07:48 09:07:49 09:07:51 09:07:58 09:08:02 09:08:07 09:08:07 09:08:08

Today's date is July 31. The time is 9:08 a.m. This deposition is being held remotely by Live Litigation. We're physically recording in Lexington, Kentucky. 09:08:10 09:08:13 09:08:17 09:08:21

The court reporter today is Alan Peacock, and the videographer today is myself, Carrie Howard. Both are presenting on behalf of Henderson Legal Services. 09:08:23 09:08:25 09:08:29 09:08:31

Will counsel please introduce themselves and state whom they represent. 09:08:33 09:08:35

MR. LONG: This is J. Preston Long for the defendants IIA Technologies PTE Limited and Pure Grown Diamonds, Inc., in the 189 matter. 09:08:38 09:08:41 09:08:46

MS. FOWLER: This is Sarah Fowler of Perkins Couie, on behalf of the plaintiffs Carnegie Institution of Washington and M7D Corporation. And with me is Joseph Ricigliano. 09:08:54 09:08:55 09:08:57 09:09:01

THE VIDEOGRAPHER: All right. And will the court reporter now please swear in the witness. 09:09:12 09:09:12 09:09:12

MR. AIRAN: There are more appearances. This is David Airan on from Leydig, Voit & Mayer on behalf of Fenix Diamonds, LLC, in the 200 case. And with me is Max Snow, also of Leydig Voit & Mayer, also representing Fenix Diamonds, LLC. 09:09:12 09:09:12 09:09:14 09:09:17 09:09:21 09:09:25

MR. MELLON: Although you can't see me, this is David Mellon, M-E-L-L-O-N, counsel for Dr. Vohra. 09:09:27 09:09:27 09:09:32

THE VIDEOGRAPHER: Okay. Now, will the court reporter please swear in the witness. 09:09:40 09:09:41

THE COURT REPORTER: My name is Alan Peacock with Henderson Legal Services. I am an Alabama Certified Court Reporter. My license number is AL013, and my license is available for inspection. 09:09:43 09:09:43 09:09:43 09:09:43 09:09:43

At this time, do all parties agree to waive any objection now or in the future to the reporter swearing in the witness remotely? 09:09:43 09:09:43 09:09:43

Please so indicate. 09:09:43

MR. LONG: No objection here. 09:09:43

MR. AIRAN: No objection on behalf of 09:09:43

Fenix. 09:09:43

THE COURT REPORTER: Thank you. 09:09:43

I would ask the witness to please raise your right hand and face the camera. 09:09:43 09:09:43

YOGESH K. VOHRA, PH.D., 09:09:43

the witness, having been first duly sworn to speak the truth, the whole truth, and nothing but the truth, testified as follows: 09:09:43 09:09:43 09:09:43

EXAMINATION 09:09:43

BY MR. LONG: 09:10:32

Q. So let me first start, Dr. Vohra, by saying thank you for being here today. There are probably any number of things you would rather be doing today; so for what it's worth, we appreciate your time. 09:10:33 09:10:36 09:10:39 09:10:41 09:10:43

Is this your first deposition? 09:10:44

A. That's correct. 09:10:47

Q. Okay. So I just want to run through a few guidelines to make sure everything goes smoothly. I think that the court reporter has already mentioned it's best if we don't talk over one another so that the court reporter can take down our conversation and there's no cross talk. Is that okay? 09:10:49 09:10:52 09:10:55 09:10:57 09:11:00 09:11:02

A. That's fine. 09:11:07

Q. From time to time, I probably will ask a 09:11:09

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if the growth rates -- the CVD growth rates that he achieved were 50 to 400 microns per hour using the substrates he was using? 10:30:27 10:30:34 10:30:38

A. Yeah. I gave you -- you know it is done for a short period of time. And what we found was the gem would grow very fast, but the quality is not that great. So it's really -- it's not just a question of the growth rate. It's the question of can one maintain the growth rate and grow as a crystal. 10:30:39 10:30:41 10:30:46 10:30:49 10:30:54 10:30:58 10:31:02

Q. Were his growths not single crystal? 10:31:04

A. No. These experiments all have diamond twins and imperfections. 10:31:07 10:31:17

Q. These experiments had twins? 10:31:18

A. Yes. 10:31:19

Q. And so if you have twins or imperfections, it's not single crystal diamond? 10:31:20 10:31:21

A. That is correct. Then it's really not a true homoepitaxial. You have multiple orientation of diamond growth on the substrate. 10:31:26 10:31:29 10:31:35

Q. What about diamond like carbon or polycrystalline diamond? Is that single crystal? 10:31:36 10:31:38

A. No. DLC is generally amorphous. And polycrystalline diamond, that's a different growth regime. 10:31:43 10:31:48 10:31:57

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Q. By "amorphous," you mean it has no crystal structure? 10:31:58 10:32:01

A. Yes. They are basically not crystalline. 10:32:04

Q. I'm going to flip to page 164 of Vohra Exhibit 3. And again, this starts at the very end of the page, so I have to scroll. The sentence starts at the end of the page. It says "the combination" and it continues on to page 165. 10:32:14 10:32:19 10:32:36 10:32:38 10:32:41

"The combination of nitrogen addition, methane concentration of 2 percent and T substrate approximately 900 to 1400C during our depositions resulted in values of alpha that satisfied the empirical condition of alpha greater than or equal to 2.5 for twin-free homoepitaxial growth." 10:32:46 10:32:50 10:32:53 10:32:57 10:32:59 10:33:03

Do you see that sentence? 10:33:12

A. Yes. 10:33:13

Q. Could you explain what it means? 10:33:14

A. What Dr. McCauley is saying here is the potential in which the result could possibly result in twin-free growth -- again, we're in a very limited area -- remember, all of his thesis work had been done on a diamond anvil with a tip of about .3-millimeters, which is three times the human hair size; so I think that's where one should be really cautious in extrapolating these results to larger 10:33:17 10:33:22 10:33:30 10:33:35 10:33:40 10:33:44 10:33:48 10:33:53

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area new growth. 10:33:56

Q. Okay. But on what -- the anvils that he used for substrates, he grew at substrate temperatures of 900 and 1400-degree C; correct? 10:33:57 10:34:02 10:34:06

A. Yes. 10:34:13

Q. And his growths satisfied the condition of alpha at greater than or equal to 2.5? 10:34:14 10:34:16

A. Yeah. But as he mentioned, it was really empirical. I don't think there's any quantitative measurements . . . 10:34:22 10:34:25 10:34:29

Q. I'm sorry. So you're suggesting that he -- my understanding of the sentence is that the empirical condition of alpha greater than 2.5 is a prediction that certain alpha values will give you twin-free growth. But my understanding is that the value of alpha is actually a quantitative number. Is that not correct? 10:34:32 10:34:34 10:34:40 10:34:45 10:34:49 10:34:51 10:34:55

A. Yeah. But I don't think anywhere in this series we measured the value of 1000. There are empirical relations where you would grow 100. And so he just is referring to the fact with verified data of 2.5, in principle, you can grow a growth rate. 10:34:58 10:34:59 10:35:10 10:35:18 10:35:23 10:35:28

Q. And he says "His deposition resulted in values of alpha that satisfied alpha greater than or 10:35:29 10:35:31

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equal to 2.5." 10:35:36

A. Yeah, but I don't think we had the quantitative -- you know, to get a quantitative value of alpha, you really have to match the growth rate along (100) and along (111). There's nowhere in this thesis really we have measured this value. 10:35:38 10:35:43 10:35:46 10:35:48 10:35:53

Q. So there's nowhere in this thesis that measures that? That's your understanding? 10:35:56 10:35:59

A. Yes. 10:36:00

Q. Okay. I'm almost done with this one, and then we'll take a break. I know we have been going for about an hour. I will try to give you a break every hour or so, but if you need breaks sooner than that -- 10:36:04 10:36:09 10:36:12 10:36:15 10:36:18

A. That's fine. 10:36:19

Q. Okay. I'll direct your attention now to -- this is page 169 of Vohra Exhibit 3. Starting here with "the observed rapid growth of diamond films," do you mind just -- I'll ask you to read and just let me know, and I will scroll for you. But I will ask that you read that section through the next page and then this figure here. I want to ask you a few questions about that section. 10:36:22 10:36:24 10:36:33 10:36:39 10:36:43 10:36:46 10:36:51 10:36:54

Let me know when you need me to scroll. 10:36:59

A. Okay. I think we can go to the next page. 10:37:02

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A. I don't know. I don't recall the details. 12:48:23
Q. Did it have physical contact to the side of the diamond seed? 12:48:31 12:48:34
A. I don't recall that. I don't actually have access right now to those designs which we dictated on the 6-kilowatt system to really make a definitive statement. 12:48:40 12:48:43 12:48:48 12:48:52
Q. It says that the temperature was measured by two-color infrared pyrometer made by Mikron Instruments with a 2-millimeter diameter minimum target size at an angle of 65 degrees C. 12:48:54 12:48:57 12:49:05
Do you see that? 12:49:09 12:49:12
A. Yes. 12:49:13
Q. And again, what is this the 2-millimeter in diameter referring to? 12:49:14 12:49:17
A. That's the aperture on the diamond to measure the temperature. 12:49:19 12:49:23
Q. And when you aim it at a 65-degree angle, is it still a circle? 12:49:24 12:49:28
A. I mean, when you look through it, you know, you see a circle. Obviously, you are looking at an angle, and that would be a certain projection of it on the diamond. 12:49:42 12:49:44 12:49:46 12:49:50
Q. It's kind of like when you shine a flashlight at an angle? It gets stretched out? 12:49:51 12:49:54

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A. It's the same principle, yes. 12:49:57
Q. So the actual spot that you would be measuring here would be 2 point wide and then stretched out in the other direction according to the 65-degree angle; is that right? 12:49:58 12:50:01 12:50:05 12:50:07
A. Yes. To make a definitive statement, one really would have to look at the optics. Because you also have to have, you know, the depth of focus of the parameter, how deep it collects light in. So it really depends on the optics to really make a definitive statement. 12:50:14 12:50:16 12:50:19 12:50:24 12:50:30 12:50:33
Because, you know, it's not a flashlight. You are -- you are picking only -- because it is focused at a point. So it only picks up certain depth of data. It doesn't look the entire time. 12:50:39 12:50:42 12:50:49 12:50:53
Q. Okay. 12:51:00
A. Because you focus it at a particular spot. So it only looks at depth, and that depends on the optics of the pyrometer. 12:51:00 12:51:03 12:51:08
Q. But, in general, it wouldn't be a 2-millimeter diameter circle, because of the angle? 12:51:11 12:51:13 12:51:18
A. It would look at a larger area. But the depth is also important for really finding the accuracy of the temperature. 12:51:18 12:51:24 12:51:27

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Q. Okay. It mentions here that the substrates were 3 and a half by 3 and a half by 1.6 cubic millimeters; so this would have been a 3 and a half by 3 and a half square that's 1.6-millimeters thick; right? 12:51:29 12:51:32 12:51:34 12:51:39 12:51:43
A. That's right. 12:51:46
Q. And this was the seed, the (100) HPHT? 12:51:46
A. Yes. 12:51:51
Q. And remember that this was a commercial yellow diamond plate. It's not a white diamond. 12:51:54 12:51:57
A. Right. 12:52:01
Q. And so this Figure 1 here on page 2 of this Exhibit shows a picture of the growth? 12:52:02 12:52:16
A. Yes. 12:52:21
Q. The left is the seed with no growth; correct? 12:52:21 12:52:23
A. Yes. 12:52:23
Q. And the right is the growth? 12:52:24
A. Yes. 12:52:26
Q. And that was -- it looks here .7 microns thick? Excuse me .7-millimeter thick/700 microns? 12:52:27 12:52:33
A. Yes. 12:52:42
Q. That was a 12-hour growth run; correct? 12:52:42
A. Yes. 12:52:44
Q. And what happened when you tried to grow 12:52:45

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it for much longer? 12:52:48
A. Yeah. I think as this paper described, I think -- yeah, a larger crystal was obtained, up to 5 carat. 12:53:00 12:53:06 12:53:14
Q. But it was brown and it cracked? 12:53:18
A. Yes. I think the same problem with several regrowth experiments. 12:53:21 12:53:25
Q. So those were done by regrowing several times? 12:53:27 12:53:29
A. That's correct. 12:53:31
Q. And during those regrowths, you would have removed some of the non-diamond growth? 12:53:32 12:53:34
A. Yes. 12:53:40
Q. And it talks about the cracking. And it says "This phenomena may be due to a hot edge that promotes darker discontinuous interface during regrowth, twin formation, or internal stresses." 12:53:41 12:53:44 12:53:48 12:53:51
So is this related, again, to the non-diamond growth around the edges? 12:53:57 12:53:59
A. Yes. 12:54:01
Q. Okay. And that non-diamond growth causes things like cracking and darker-color inability to grow very thick? 12:54:02 12:54:05 12:54:10
A. Yes. 12:54:12
Q. Referring to the next page -- this is 12:54:16

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Q. So you talked earlier about how a two-color averages the temperatures within that little spot. Is that right? 01:49:07 01:49:08 01:49:13

A. Yes. 01:49:16

Q. Or roughly average. So my question is, if you're measuring, let's say, the center of a diamond with this pyrometer, will the pyrometer be able to tell you what the coldest point on the diamond is? 01:49:21 01:49:27 01:49:31 01:49:38

A. No. 01:49:48

Q. Because it's going to take an average; is that right? 01:49:49 01:49:51

A. Yes. 01:49:54

Q. Okay. Will it be able to tell you what the hottest point on the grill surface is? 01:49:57 01:49:59

A. Can you repeat the question? Are you doing measuring only at the center? 01:50:09 01:50:12

Q. No. Now let's say you move it to the edge. Okay? Will it be able to tell you what the hottest points on the edge is? 01:50:14 01:50:17 01:50:21

A. Sure. If you can do the scanning across the edges and you can definitely measure the gradient within that revolution of 2 millimeters, you can find the hot spot. With hot spots, you can also probably target visually -- usually they come back of the graphite formation on the edges. 01:50:24 01:50:28 01:50:34 01:50:43 01:50:47 01:50:50

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Q. So when you get kind of -- I will call it -- non-monocrystalline growth at the edges, that's a sign of a hot spot; is that correct? 01:50:57 01:51:00 01:51:03

A. I think this would be a very difficult determination to make because you may be getting non-diamond growth because it is not a (100) surface, so it may not necessarily be related to temperature. It could be that you have (111) surface exposed. 01:51:18 01:51:23 01:51:32 01:51:35 01:51:37 01:51:41

Q. All right. What if the non-monocrystalline growth is on the (100) surface. Then do you think it would be because of temperature? 01:51:47 01:51:49 01:51:56 01:51:58

A. It could be then because the temperature may be too high for -- temperature be too high there and graphite is nucleated, yeah. 01:51:59 01:52:01 01:52:05

Q. So the temperature is too hot at that location, and it's -- which is much hotter than the center of the diamond? 01:52:08 01:52:12 01:52:18

A. That's right. 01:52:21

Q. So I just want to go back to this example, briefly. Let's say you cite this pyrometer on a hot spot, and the hot spot is at -- you know, it's hot but it has multiple different temperatures in it. Okay? It has a range of temperatures in the hot 01:52:26 01:52:29 01:52:36 01:52:42 01:52:45

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spot. Will this pyrometer be able to tell you what the hottest temperature in that spot is? 01:52:49 01:52:54

A. No. It will only give you an average temperature. Because the way it works is it really is taking a ratio of the infrared light coming out and calculating. So you have really no way to find the maximal or minimal temperature. 01:52:58 01:53:00 01:53:03 01:53:07 01:53:13

Q. So let's say you poke this at the edge, and then you put this at the center, you might be getting a temperature gradient reading that is much too low because of this averaging; is that correct? 01:53:18 01:53:22 01:53:24 01:53:27

A. Yeah. It's definitely not accurate. 01:53:37

Q. Okay. All right. All right. So let me move on to Exhibit 11, which is the 078 patent. 01:53:41 01:53:49

I'm sorry. Maybe it's Exhibit 12. Yeah, it's Exhibit 12. I apologize. 01:54:06 01:54:13

So if you took this patent, what do you think the kind of -- the main thrust of the invention here was? 01:54:22 01:54:25 01:54:29

A. I think it was multipronged because of the gross chemistry substrate design of the holder. 01:54:34 01:54:37

Q. Okay. 01:54:46

A. Also some of the innovation was in terms of translation of the diamond stage. 01:54:48 01:54:50

Q. Okay. 01:54:53

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A. So it's really multiple levels. It's hard to say this one thing. 01:54:53 01:54:58

Q. Okay. Absolutely. I want to go to -- I want to jump to Claim 1 which is on page -- well, it's actually on page 18, the part I'm looking at. Let me -- I will zoom in for you. 01:55:00 01:55:15 01:55:21 01:55:25

Do you see that, those highlights? 01:55:38

A. Yes. 01:55:39

Q. Okay. So do you think this is something that all diamond -- I'm sorry -- that all MPCVD diamond chambers do? 01:55:43 01:55:49 01:55:56

A. It's really not just a question of the temperature reading; it's not just the diamond chamber; it also depends, of course, on the heat sink design at the substrate holder. 01:56:04 01:56:14 01:56:18 01:56:22

Q. Sure. Absolutely. 01:56:25

A. So I think there are innovations there which reduces this temperature gradient. So it's not just a generic block MPCVD system would do this. You have to, of course, have the appropriate substrate holder design to achieve that, to achieve the results. 01:56:27 01:56:30 01:56:37 01:56:40 01:56:42 01:56:46

Q. Right. Like the design shown in Fig. 2B? 01:56:48

A. Yes. 01:56:56

Q. Okay. So let's say that you have just 01:56:57